Detection of Attacks and QoS Improvement using Heterogeneous Green Framework in Cognitive Radio Network

V.Gobu¹, J.Preethi²

¹PG Student, ²Head of the Department
Department of Computer Science and Engineering
Regional Centre of Anna University, Coimbatore, India.

Abstract— Energy-efficient communication has sparked tremendous interest in recent years as one of the main design goals of future wireless Heterogeneous Networks (HetNets). This has resulted in paradigm shift of current operation from data oriented to energy-efficient oriented networks. This framework is cognitive in holistic sense and aims at improving energy efficiency of the entire network, not presently one remote part of the association. In particular, a repeated approach, name as energy-cognitive sequence, which extend the standard cognitive phase and enables dynamic selection of different available strategies for reducing the energy consumption in the network while satisfying the quality of service constraints.

Keywords— Cognitive radio, green framework, heterogeneous network, energy efficiency, security, throughput, mobility.

I. INTRODUCTION

Cognitive radio is an intelligent wireless communication system that is aware of its immediate surroundings, and use the line of attack of understanding-by-building to learn from the environment and adapt its internal states to statistical variations in the incoming RF stimuli by making corresponding changes in certain operating parameters in synchronized, by two major objectives in psyche,

- Exceedingly dependable exchanges on every occasion and anywhere needed;
- Well-organized use of the means of communication range.

Six keywords stand out in this definition namely, awareness, intelligence, learning, adaptively, consistency, and good organization. Implementation of this far-reaching combination of capabilities is feasible as a result of advancement in digital signal processing, networking, machine learning, computer software, and computer hardware. In addition to the cognitive capabilities mentioned, a cognitive radio is also endowed with reconfigurability. This final competence is providing by means of a stage known as software-defined radio, upon which a cognitive radio is built spectrum usage. It may be regarded as similar to generic media access.

Depending on transmission and reception parameters, there are two main types of cognitive radio:

- Full cognitive radio (Mitola radio), in which every possible parameter observable by a wireless node is considered. Cognitive radio be able to utilize of spectrum sensing, in which just the radio-frequency spectrum is considered. Other types are dependent on parts of the spectrum available for cognitive radio.

- Licenced-Band Cognitive Radio which is capable of using bands assigned to licensed users. The IEEE 802.22 working group has developed a standard for wireless regional area network (WRAN), which operates on unused television channels.
- Unlicensed-Band Cognitive Radio, which preserve single exploit unlicensed part of the means of communication occurrence band.
• Cognitive-radio network aspire to utilize the range in a dynamic manner by allowing radio terminals to operate in the best available frequency band, control (MAC) problems in existing systems [1-3].
• Maintain textbook message food during transitions to better spectrum.

II. EXISTING SYSTEM

Primary objectives of the cognitive radio are to provide highly reliable communications whenever and wherever needed and to utilize the radio band professionally. The type issues within the cognitive telephone system are awareness, intelligence, learning, adaptivity, reliability, and efficiency. Cognitive radio technologies can be used in lower priority secondary systems that improve spectral efficiency by sensing the environment and then filling the discovered gaps of unused licensed spectrum with their own transmissions.

A. Basic Cognitive Cycle

The Basic Cognitive Cycle involves three major tasks which are

• Radio-scene analysis,
• Channel identification, and
• Dynamic spectrum management and transmit-power control.

The radio-scene analysis includes the detection of spectrum holes by for example sensing the radio occurrence variety. The canal classification includes assessment of the channel state information which is needed at the receiver for coherent detection. The transmitter power control and dynamic spectrum management select the transmission power levels and frequency holes for transmission based on the results of radio scene analysis and channel identification. The first two tasks are carried out in the receiver while the third task is carried out in the transmitter, which requires some form of feedback between the transmitter and receiver.

1) Limitations

Spectrum sensing is a crucial task in a cognitive radio system. Spectrum sensing is the task of obtaining awareness about the spectrum usage and existence of primary users in a biological region. This consciousness be able to live obtain via with geo location plus folder, through with beacon, otherwise near limited range sense at cognitive radios. When be a cons are used, the transmitted information can be occupancy of a spectrum as well as other advanced features such as channel quality. Although spectrum sensing is traditionally understood as measuring the ethereal pleased, otherwise measure the broadcasting occurrence power over the spectrum; when cognitive radio be careful, it be a extra universal period to involve obtaining the spectrum usage characteristics across multiple dimensions such when point, room, regularity, as well as policy. It too involve determining what types of signals are occupying the spectrum including the intonation, waveform, bandwidth, delivery service occurrence, etc. However, this requires more powerful signal analysis techniques with additional complexity. To maximize the spectral and energy efficiency, power and frequency has to be jointly controlled. This is a challenging task. Also the complex algorithms used for spectrum handoff [4-7] by the SUs also consume considerable energy.

Figure 2: Cognitive Cycle for Cognitive Radio Link

Mobile ad hoc networks are characterized by dynamic topologies due to uncontrolled no demobility, limited and variable shared wireless guide bandwidth, as well as wireless strategy embarrassed by sequence power. One of the key challenges in such networks is to design dynamic routing protocols that are efficient, that is, consume less overhead. Whenever a traffic source desires a path, it initiates a direction breakthrough progression by sending a route request for the destination and waits for a direction respond. Every one path detection overflow be connected with significant latency in addition to transparency. This is predominantly proper for outsized network. Therefore, used for on-demand steering near be efficient, it is attractive to continue the course unearthing occurrence low to reduce latency and overhead.

III. PROPOSED SYSTEM

A. Energy Cognitive Cycle

A cyclic approach, named as energy-cognitive cycle, which extends the classic cognitive cycle and enables dynamic selection of different available strategies for reducing the energy consumption in the network while satisfying the quality of service constraints. As shown in Figure.3.2, all the tasks of energy-cognitive cycle are divided into two broad categories: the network awareness and the selection and access modules. The first module is further composed by the
sensing and the analysis & learns blocks. The second module consist of the decision and the adapt bloc.

![Energy Cognitive Cycle](image)

**Figure 3: Energy Cognitive Cycle**

was carried out by Helsinki University of Technology, which deals with the use of motes to the progression of paper production. The sensors [11-15] are fixed into the rolls used in the paper drying stage. The role of the motes is to compute temperature in order to manage the heating rolls. The integration of a mote to a part of the equipment that firemen wear, not only makes the management of fire extinguishing easier and more effective but can also act as a additional safety measure by enlightening the exact location of each fireman. In case of an accident, the rescue crews can act more successfully [8-10]. Delivery and distribution systems are an added area of application for wireless sensors. In all these applications, the prolonged lifetime can be attained by integrating the distributed clustering mechanism to these real world applications.

### B. Sensing

This block implements functionalities that enable Access Points (AP) and User Equipments (UE) to gather the required information about the network status by monitoring the radio environment.

### C. Analysis and learn

By exploiting information in the sensing database, APs and UEs characterize their surrounding environment. Moreover sensing data and static information about the network are jointly processed to estimate the future status of the network.

### D. Decision

Based on the feedback received by the network awareness module, UEs and APs take decision about the network energy efficient operating point. Constraints such as AP and UE capabilities and QoS requirements of UEs are used in this decision process to modify the network strategy.

### E. Adapt

Thereafter, APs and UEs change their operating parameters according to the decision block information. This reconfigurability enables both APs and UEs to fast adapt their behavior to the dynamic network environment. The various parameters amongst which adaptation is carried out are activation of APs, operating frequency, radio transmission parameters.

**Figure 4(a): Energy versus Time**

**Figure 4(b): Energy versus Time**

The tasks defined by the first two blocks are performed separately in both APs and UEs; as such a design enables distributed algorithms [14-16]. On the contrary, there is exchange of information amongst neighboring APs to cooperatively enhance the awareness on the network status. However, in the latter blocks, APs and UEs cooperate at the
algorithmic level sharing optimization parameters to improve the performance of whole network. Such a design avoids that optimization in one part of the network produce detrimental effects on some other part of the network.

IV. CONCLUSION

Heterogeneous wireless networks set new challenges for broadband and sustainable communications. To enable fast and effective adaptation to the dynamic wireless environment, in this article, a CR-based framework, where awareness and intelligence are shared amongst all network terminals. Also introduce a novel EE dedicated signaling architecture, which allows to networks characterized by different RATs to exchange communication parameters in technology agnostic way and limited overhead. Future studies will extend this framework to include the user mobility challenges and further investigate the advantages/drawbacks of the architecture from the backhaul network perspective.

REFERENCES